

PATENT COOPERATION TREATY

EEB

From the INTERNATIONAL BUREAU

to

PCT

To:

2691060

LEASON, David
Darby & Darby P.C.
Post Office Box 5257
New York, NY 10150-5257
ETATS-UNIS D'AMERIQUE

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
1 August 2002 (01.08.2002)

PCT

(10) International Publication Number
WO 02/058550 A3

(51) International Patent Classification⁷: **A61B 5/0452,**
5/0468, G06F 17/00

Irongate Drive, Andover, MA 01810 (US). **SHAH, Dipen**
[IN/FR]; 65 Rue de la Republique, F-33400 Talence,
Bordeaux (FR).

(21) International Application Number: PCT/US01/46348

(74) Agents: **LEASON, David et al.**; Darby & Darby P.C., Post
Office Box 5257, New York, NY 10150-5257 (US).

(22) International Filing Date:
2 November 2001 (02.11.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/247,269 10 November 2000 (10.11.2000) US
60/295,217 1 June 2001 (01.06.2001) US

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, EC, EE, ES, FI, GB, GD, GE, GH, HR,
HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,
LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,
NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK,
SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA,
ZW.

(71) Applicant (*for all designated States except US*): **C.R.
BARD, INC.** [US/US]; 730 Central Avenue, Murray Hill,
NJ 07974 (US).

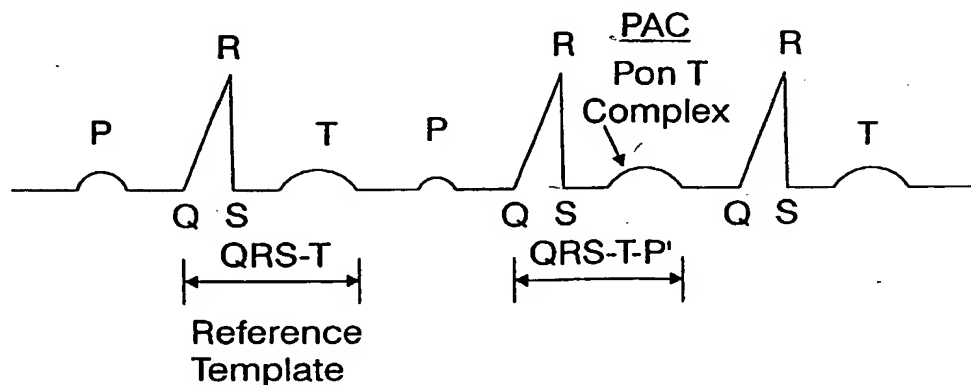
(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,
IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF,
CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD,
TG).

(72) Inventors; and
(75) Inventors/Applicants (*for US only*): **MACADAM,
David, P.** [US/US]; 5 Cyndy Lane, Millbury, MA 01527
(US). **WANG, Paul, J.** [US/US]; 750 Washington Street,
Boston, MA 02111 (US). **YANG, Shawn** [US/US]; 6

Published:
— with international search report

[Continued on next page]

(54) Title: TRACKING ECTOPIC BEATS OR DERIVING P-WAVES IN ELECTROCARDIAC SIGNALS HAVING SUPERIMPOSED COMPLEXES



(57) Abstract: A system and compressor for tracking ectopic beats is disclosed wherein ECG data from multiple leads is acquired and a segment of said ECG signal is used as a reference template. The best fit between the reference template and the acquired data is determined using a correlation coefficient calculation. There is also disclosed a system and a processor for deriving a p-wave signal from a premature atrial contraction (PAC) beat in an ECG signal wherein ECG data is captured and processed so as to derive the p-wave signal from the PAC beat, thereby obtaining information on the p-wave in an ECG signal wherein the complexes partly overlap and obscure parts of the waveform.

WO 02/058550 A3

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 01/46348

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61B5/0452 A61B5/0468 G06F17/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61B G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, BIOSIS, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	THRONE R D ET AL: "Use of tachycardia templates for recognition of recurrent monomorphic ventricular tachycardia" PROC. COMPUTERS IN CARDIOLOGY MEETING. JERUSALEM, SEPT. 19 - 22, 1989, WASHINGTON, IEEE COMP. SOC. PRESS, US, 19 September 1989 (1989-09-19), pages 171-174, XP010022102 ISBN: 0-8186-2114-1 cited in the application	1-3, 31, 32, 34-39
Y	the whole document -/-	6, 42



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is, taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

7 November 2002

Date of mailing of the international search report

21. 11. 02

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Jonsson, P.O.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 01/46348

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/46348

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9102484	A	07-03-1991	US 5020540 A	04-06-1991
			AT 173551 T	15-12-1998
			AU 653318 B2	29-09-1994
			AU 5280190 A	03-04-1991
			CA 2064791 A1	23-02-1991
			DE 69032771 D1	24-12-1998
			DE 69032771 T2	29-07-1999
			EP 0489010 A1	10-06-1992
			JP 5500167 T	21-01-1993
			JP 3138752 B2	26-02-2001
			WO 9102484 A1	07-03-1991
WO 0167950	A	20-09-2001	AU 5386101 A	24-09-2001
			WO 0167950 A1	20-09-2001
			US 2001056245 A1	27-12-2001
			AU 4576701 A	24-09-2001
			AU 4744001 A	24-09-2001
			AU 4920601 A	24-09-2001
			WO 0167954 A1	20-09-2001
			WO 0167953 A1	20-09-2001
			US 2001056289 A1	27-12-2001
			US 2002038093 A1	28-03-2002
			AU 5705201 A	23-10-2001
			WO 0176461 A2	18-10-2001
			US 2002026220 A1	28-02-2002
US 5772604	A	30-06-1998	AU 6551498 A	12-10-1998
			US 6064906 A	16-05-2000
			WO 9841144 A1	24-09-1998
US 5840038	A	24-11-1998	NONE	